



May 9, 2005

Volume 3, No. 19

Drilling, sampling done for new well

Fluor Hanford's Groundwater Remediation Project has completed drilling and sampling a new well adjacent to the 216-Z-9 Trench located east of the Plutonium Finishing Plant



Drillers tighten the downhole equipment in preparation for drilling at the Z-9 well in 200-West Area.

(PFP). Well 299-W15-46 (the "Z-9 Well") provided information about the distribution of contaminants in the soil zone above the groundwater (vadose zone), and contamination in the groundwater from the water table several hundred feet below the surface down to the underlying basalt layer at a depth of 525 ft. The Z-9 Well can now serve as a long-term monitoring well to evaluate contaminant levels in the groundwater, and as an access location for more sophisticated investigations of the nature and extent of the contamination.

From 1955 to 1962, liquid wastes containing plutonium and carbon tetrachloride from finishing and recycling processes at PFP were put into the 216-Z-9 Trench. Soil samples taken in the 1960s and 1970s provided estimates of the plutonium content of the crib ranging from four percent of a metric ton up to 20 percent of a metric ton. In a two-year soil mining effort beginning in August 1976, over five percent of a metric ton of plutonium was removed from the upper foot of soil. Nearly another estimated five percent of a metric ton of plutonium still remains. The trench also received an estimated 130,000 to 480,000 kilograms of carbon tetrachloride.

Because the well is immediately adjacent to the trench, Fluor Hanford's drilling and sampling team expected to find high levels of radiological and hazardous constituents in the subsurface. Consequently, they added extra safety precautions at the work site. An enclosure was constructed around the well, special handling procedures and controls were established to handle the samples, and a first-of-a-kind exhaust system was installed. Workers wore appropriate personal protective equipment during each work evolution. As a result, the drilling campaign was conducted with zero accidents.

During drilling, 70 samples were collected from the Z-9 well—soil samples, vapor samples, and groundwater samples. Plutonium and americium concentrations were detected, often at extremely high levels, at depths ranging from 48 feet to 122 feet. The highest concentration of carbon tetrachloride in the vadose zone was

at approximately 65 feet.

The Z-9 well samples suggested carbon tetrachloride may be present in the vadose zone as a dense, nonaqueous phase liquid (DNAPL). The presence of this form of the contaminant was suspected but not previously confirmed. The highest concentration of carbon tetrachloride measured in groundwater was approximately 750 times higher than the drinking water standard.

Sediment and groundwater samples were also collected for researchers at the Pacific Northwest National Laboratory who are conducting scientific studies to help understand the contaminant distribution in the subsurface. Fluor Hanford is providing the information from this well to a DOE subcontractor who is applying multiple investigative techniques to identify the possible distribution of carbon tetrachloride as a DNAPL over a larger area near PFP.

"The information gathered from this well has already significantly improved our understanding of carbon tetrachloride and plutonium contamination in the subsurface," said Virginia Rohay, the Fluor Hanford lead for the carbon tetrachloride investigation. "The contaminants found in this well represent significant ongoing and future risk to use of the groundwater, and exposure risks to persons who might dig into the waste site intentionally or unintentionally." The new knowledge gained from the recent well sampling will be used in future cleanup decisions concerning the trench and the underlying groundwater. ■

Michele Gerber, Communications